

Solutions for Meet 4

Individual Questions

1. Use a Venn diagram to describe the problem. We have $(21 - x) + x + (26 - x) + 8 = 46$. Solving $x = 9$.

2. The left side simplifies to $\frac{(\cot x + \tan x)(\cot x - \tan x)}{(\cot x + \tan x)(\cot x + \tan x)}$, which after cancelling the common factor, and converting to $\sin x$ and $\cos x$, and simplifying the resulting complex fraction, becomes $\cos^2 x - \sin^2 x$. When this is added to $2\sin^2 x$, we get $\cos^2 x + \sin^2 x = 1$. Since the given expression is thus identically equal to 1, we have $(m, M) = (1, 1)$

3. Draw a picture, and draw a line parallel to the ground to create a rectangle and "triangle".
Now $\sqrt{x^2} = 9^2 + 2^2$ and $x = 85$

4. The equation is of the form $a^3 + b^3 = (a + b)^3$. This simplifies to $ab(a + b) = 0$. Hence, in this equation, $2x + 8 = 0$ or $2x - 4 = 0$ or $4x + 4 = 0$. The resulting solutions are $-4, 2, -1$

5. Chart the progress of the players, with B and C beginning with \$b and \$c respectively.

	A	B	C	
<i>start</i>	10	b	c	
<i>rd 1</i>	30	b - 10	c - 10	Since $40 - c = 10$, $c = 30$
<i>rd 2</i>	$40 - b$	$3b - 30$	$c - b$	
<i>rd 3</i>	$40 - c$	$4b - c - 30$	$3c - 3b$	

6. let the length of the base be y and let the length of one of the legs of the isosceles triangle be x. Since $24x = 20y$, $y = \frac{6x}{5}$. Thus $400 + \left(\frac{9x^2}{25}\right) = x^2$ and $x = 25$. Then $y = 30$ and the perimeter is 80.